

QUEEN OF FLOWERS: ROSES



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Roses: An Introduction

Roses are known as ‘the Queen of Flowers’. Roses are always in demand as they are the only flowers that are associated with beauty, fragrance and eternal love. Regarded as the most important cut flower world-wide, commercially as well as aesthetically, roses are traditionally grown as perennial woody shrubs. Generally the growth habit of the rose plant is to grow as an erect shrub; however trailing roses or climber roses with stems having prickles are not so uncommon. The flower size normally varies from large (single roses used as cut flowers) to small (bushy roses or bunch roses used for bedding purposes) depending on varieties. The flower color is available in almost all color ranges such as white, purple-violet, yellow, orange, red, maroon and magenta. New hybrids and propagation methods have made it possible to cultivate a single variety of rose plant with multiple-colored flowers



Taxonomy of Roses

Roses belong to the genus *Rosa* and family Rosaceae. There are over 120 species of roses which are in existence according to Rehder's classification but only eight species are used for commercial as well as home cultivation. These eight species of roses are: *Rosa damascene*; *Rosa foetida*; *Rosa Chinensis*; *Rosa gigantic*; *Rosa gallica*; *Rosa wichuraiana*; *Rosa moschata* and *Rosa multiflora*

Origin and Distribution of Roses

Most of the rose species have their Centre of Origin in Asia except few that are native to Europe, North-America and North-West Africa

Botanical Description of Roses

Roses are perennial woody shrubs, the leaves are pinnate, usually 5-15 cm in length, alternate to each other and leaflets have serrated margins. The flower has mostly five petals each of which are divided into lobes which are generally pink or white in color except a few which have yellow or red color lobes. It has superior ovary which further develops into achenes. The fruit is a berry like structure known as *rose hip*. Roses are mainly deciduous in nature which shed their leaves during winters. The stem bears thorns which are technically *the prickles*. The prickles in the roses help them to hang over other vegetation. Many a times the prickles when grown in large bushes help them avoided by animals thus act as self-defense system. Roses are insect pollinated plants.



Types of Roses

Most popular types of roses are:

1. Tea roses
2. Hybrid perpetuals
3. Hybrid tea roses
4. Floribundas
5. Polyanthas
6. Miniature roses
7. Climber roses



Tea Roses: Tea roses are considered as one of the oldest varieties of roses. The name is given because of its tea-scented flowers

Hybrid Perpetuals: Hybrid perpetuals are one of the hardy varieties of roses with large blooms

Hybrid Tea Roses: Hybrid tea roses are developed by crossing between Hybrid Perpetuals and Tea Roses; hence it possesses characteristics of both of its parents viz. large blooms and hardy plants as Hybrid Perpetuals and tea-scented as Tea Roses. The plant grows as a hardy bush with erect stems and the height of the plant reaches up to 2 meters under good cultural management conditions. The flowers are slow-opening and have good keeping quality (vase life). Hybrid tea varieties can be divided into different subgroups on the basis of purposes for which they are cultivated

Subgroups of Hybrid Tea Roses

- *Hybrid Tea Varieties for Bedding Purpose:* Golden Giant, Buccaneer, Dutch Gold, King's Ransom, Super Star, Montezuma, Bettina, Christian Dior, Avon, Happiness, Sterling Silver, Blue Moon, First Prize, Valencia, Careless Love, American Star, Kiss of Fire, Double Delight
- *Hybrid Tea Varieties for Exhibitions and Displays:* Christian Dior, King's Ransom, Show Girl, Golden Giant, Sterling Silver, Super Star, Mischief
- *Hybrid Tea Varieties for Commercial Growers:* Happiness, Super Star, Mercedes, Gladiator, Montezuma
- *Hybrid Tea Scented Roses:* La France, Crimson Glory, Blue Moon, Seventh Heaven, Heart Throb

Floribundas: Floribunda roses are developed by crossing between Hybrid Tea Roses and Polyantha Roses; hence it possesses characteristics of both of its parents, viz. profuse growth like Polyanthas and magnificent flowers as that of Hybrid Teas. Some of the important varieties of floribunda roses are Independence, Gabriella, Elizabeth, Lavendar Princess, Anabell, Simplicity, Bridal White, European, Red Gold, Iceberg, Bicentennial and Charisma. Among these, Red Gold is a bicolor variety whereas Bicentennial and Charisma are Multi Color varieties. Rest all are single colored

Polyantha: These roses are low-growing short shrubs with a spreading growth habit. Flowers are often produced in bunches making each cluster of flowers quite spectacular like a flower bouquet

Grandiflora: These roses are developed by crossing between Hybrid Teas and Floribundas. Plants are normally larger than either of the parent and the flowers are borne in small clusters like Floribundas. Some of the important varieties of grandiflora roses are Queen Elizabeth, Gold Medal, Pink Parfait, and Little Darling

Miniature Roses: Miniature roses are one of the most hardy, shortest and oldest varieties of the roses. Miniatures are believed to be originated in a temperate climate and therefore these plants are winter-hardy. Miniature roses are ever blooming rose varieties and therefore quite popular among home gardeners as ornamental houseplants. Since miniature roses are dwarf, they are used as edge plants, pot plants, and table gardens and window gardens in residential houses. Among miniature rose major varieties include Desert Charm, Beauty Secret, Gourmet Popcorn, Cinderella, Summer Butter, Sun Maid, Jewel, Orange Cascade, Pink Cascade, and Snow Carpet

Climber: These roses are tall, perennial rose varieties with flexible, climbing stems. They normally grow around a support by using their prickles to twine around the support structure. Climbing roses grow up to a height of 3 to 6 meters

Ramblers: These are trailing roses that are suitable for growing around garden walls, trellises, pergolas, arches and fences

Why do we Grow Roses?

For Cut Flower: There is a strong demand for rose cut flowers both in the domestic and international markets all throughout the year. Rose cut flowers have great export potential too. Hybrid Tea roses are best suited for producing high quality cut flowers

For Bedding Flower: Roses are grown in masses in garden beds for creating mass effect. Polyanthas and miniature roses are best suited for creating rose beds

For Garden Displays and Flower Arrangements: Roses are considered as the most beautiful flowers on the earth. Even a single rose plant is sufficient to enhance the overall beauty of a garden. Roses are popularly used for creating various flower arrangements also

For Indoor Gardening and Interior Decorations: Miniature roses are best suited for indoor gardening purposes. Roses are an essential part of various interior flower displays. Rose petals can be used to create various portraits and can also be used for other decorative purposes

For Planting Materials: Rose stem cuttings, budded plants, layered plants and grafted plants are prepared from mother plants. Normally healthy branches having one or two turgid buds are selected for the preparation of cuttings. For budding and grafting purposes, healthy rootstocks are raised in nurseries

For Dried Petals: Dried Petals of roses are used for making fragrant sticks

For Rose Water Preparation: Rose water has medicinal as well as cosmetic uses

For Rose Oil Extraction: Rose oil is extracted from fragrant rose varieties such as varieties of *Rosa damascena* by distillation process. Rose oil thus extracted is used in many cosmetic products such as soaps, perfumeries and beauty creams

For Processed Rose-based Edible Products: Rose hips harvested from mature, wilted flowers that are grown in an organic production system may be used to prepare Jams, Juices, Jellies, and Marmalade

For Using as Herbal Medicines: The fruits of many species of roses are used to prepare medicines to cure stomach problems and stop cancerous growths. Rose hips contain Vitamin C and are used as food supplements also

Growing Practices for Roses

Site Selection: Open sunny locations are best preferred for large-scale cultivation of roses. It is always recommended to provide a wind break to protect the plants from prevalent strong winds. Roses thrive best under full sun for at least half of the day but a little shade after full sun in hot climate is also considered supportive for a better crop. The site should be away from the traffic and buildings in order to avoid pollution and shade

Light Requirements: Roses, if cultivated in shade, are more susceptible to fungal diseases as well as insects such as thrips that will later affect the quality of flowers and leaves. Artificial light can be given if needed, in case of low light intensities. Light is required for photosynthesis, a process of preparation of food and energy which is then utilized by plant for growth and development. Light is also required for water and food movements in plants. It is highly recommended to plant roses where they will receive at least 6 hours or more of sunlight during the day

Frost Hardiness: Roses are not very sensitive to cold winter temperatures; however in hilly areas, it is always good to provide some winter protection for the rose plants. This is because sometimes sudden drops of temperature may damage tender growth of the plants

Soil Requirements: Well-drained, fertile loam soils are best suited for rose growth. A garden soil having proportionate amount of sand, clay, humus and lime is considered as perfect growing medium for growing most of the rose varieties. Soil pH of 5.5 to 6.5 is also required for good plant growth. The pH, if not satisfactory, can also be modified using amendments like gypsum, lime, etc. The type and amount of soil moisture is also important. The soil should have proper drainage as well as good water holding capacity (this is the reason why clay loam to loam soils are preferred for rose plant growth)

Site Preparation: One or two deep ploughing of the field is recommended. The field and the pits where the rose cuttings are to be planted should be kept open for few days after ploughing. The pits are then restocked using properly decomposed FYM (Farm Yard Manure) and garden soil. For planting roses in the gardens, a layout should be made by considering the type of garden (formal or informal) to be created. For formal garden, beds of various shapes viz. square, rectangle, circle can be prepared and for informal gardens, informal beds according to the garden lay out can be prepared

Planting: When roses are to be planted individually, it is recommended to dig the pits of 60 to 75 cm depth and 75 to 90 diameter before monsoon arrives. The top soil should be mixed with organic manures and replaced into the pit at the time of planting

Propagation: Roses are generally propagated using vegetative propagation methods. As rose seeds are very small and take long time to germinate, they are used only for hybridization purposes. Roses are generally propagated through various methods such as budding, grafting, cutting and layering. Miniature roses, Climbers and Polyanthas are propagated through stem cuttings. Generally budding is preferred over all other methods in almost all varieties. Budding is normally done during November to February in tropical and subtropical regions. Rootstocks are prepared in October at the time of pruning. There are various insects- and disease-resistant rootstocks available in the market for grafting and budding purposes. Hence pest-resistant good quality root stocks should be used for rose propagation. Generally rootstocks of *Rosa multiflora* and *Rosa indica* var. *odorata* are considered best. Nowadays T-budding or Shield budding is the most favored propagation method among commercial rose growers as the success percentage in this propagation method is very high as compared to other methods. Use of plant growth regulators such as IBA is recommended in certain cases for enhancing the success rate of propagation

How T-Budding is Done?

T-budding or shield budding in roses is done when the bark is slippery. A T-shaped bark is removed from the rootstock and a bud is fixed. The portion is then wrapped with polythene strip to make the cambium layer compatible with the bud and also to avoid any possible infections that may enter the bud union

Care of Rootstocks

The rootstocks should be kept under shade before using for budding purposes. If there is bare root stock, it is recommended to soak in water to retain the softness as well as moisture. Growers may also purchase budded-plants from authorized nurseries for propagation purposes

Tips for Buying Healthy Plants from Nurseries

1. Choose high-quality plants even though price is a bit high
2. Remember, plant loss is often higher with lower quality plants
3. Avoid buying plants with dried tissues and shriveled bark
4. If the plant tissues are dry on arrival, soak the roots in water, or cover the plant with moist soil for several days until the tissues have adequate amount of moisture
5. Plants with bare roots must be planted before new growth appears
6. Avoid plants that start to grow; plants that grow before they are planted have less survival rate
7. Choose only dormant plants for bare-root planting

Planting Time: The ideal time of planting roses in the open field is late winters because roses planted in the early winters usually die back more than those planted in the late winters. Staking may be provided for young plants. The plants are to be watered immediately after planting to keep the soil moist. Watering depends on nature of soil. Hoeing the soil between two irrigations is also recommended for improving soil aeration and for controlling weed growth. Rose plants growing in containers may be planted throughout the year

Planting Method

Pits having dimensions of 60 to 75 cm depth and 75 to 90 diameter are dug in the main field before monsoon arrives. These pits are kept open until the planting time which is normally during fall and winter seasons. At the time of planting, the top soil is mixed with any of the organic manures (FYM or compost) and bone meal to provide nutrition to the growing plants. Adding chemical fertilizers are NOT advised at the time of planting; doing so may injure the developing roots. While planting the rose plants, care is taken to position the bud union above or at par with the soil surface. In colder regions, however, bud union should be placed 1 to 2 inches below the surface. A single rose plant is planted in a pit. After placing the rose plants in the pits, the pits are filled with the manure-mixed top soil. The plants are watered soon after planting while taking care of the position of bud union on soil surface. A slight trimming of planted roses is recommended. Ideally plants are trimmed to 2-5 strong canes, 8 to 12 inches long. All dead and weak leaves and stems are removed. Finally soil around each individual plant is mounded at least 6 inches deep.

This is done to protect the growing plants from drying out. This soil mound is removed soon after the sprouting of the buds i.e about two weeks after planting. Fertilizing plants with chemicals is recommended only after vigorous growth has started



Economic Life of a Rose Garden

Under good cultural management practices, a rose garden produces flowers for 15 years or more. When the productivity of rose plants start decline, it is advised to rejuvenate old plants

Irrigation

As a general rule, the root zone of the growing rose plants need a moderate amount of soil moisture throughout their growth period. Irrigation should be scheduled depending upon the *season, weather* and *type of soil* in which the plants are grown. In heavy soils, which have good water holding capacity, irrigation is less frequent in contrast to planting in light soils where irrigation is very frequent. During rainy season plants do not require irrigation whereas frequent irrigation is necessary during summers



Tips for Proper Irrigation

Irrigation should be done when the surface of the soil is dry. While irrigating the rose plants, it is advised to irrigate around the perimeter of the plant rather than at the base of the stem. While irrigating the rose plants, wet the soil to the full extent of the plant root zone, approximately 50-60 centimeters deep

Scheduling Irrigation for a Rose Garden

Irrigation should be scheduled depending upon the season, and type of soil in which the rose plants are grown. Table given below shows how to schedule irrigation based on these parameters

Season	Soil
SUMMER: irrigation is done at an interval of 5 to 6 days	SANDY SOILS have VERY LOW water-holding capacities and hence must be irrigated every 4 to 10 days
WINTER: irrigation is done at an interval of 7 to 10 days	LOAM SOILS have MODERATE water-holding capacities, and may need irrigating every 8 to 15 days
RAINY SEASON: plants do not require irrigation	CLAY SOILS have HIGH water-holding capacities and may need to be irrigated only every 15 to 30 days

Manuring and Fertilizing

For obtaining a good yield of roses, it is recommended to use both organic and inorganic fertilizers. There are many readymade rose mixtures available in the market which can be bought and applied in bushes as well as in rose beds to replenish the soil fertility. One advantage of using rose mixtures is that any new grower, who does not have past experience of growing this crop, can use it readily without bothering much about fertilizer mixing rules

Nitrogen Requirements: Since roses have vigorous vegetative growth, they feed on nitrogen heavily and therefore abundant nitrogen supply is required to produce healthy rose plants. As a general rule, rose bushes may need nitrogen-feeding at an interval of 4-6 weeks beginning just before bud break in early spring until 3 weeks before the first fall frost. Ammonium sulfate or its equivalent such as urea may be applied @ 2 tablespoons/plant

Phosphorus Requirements: First P-application is done along with first N-application at pre-bud-break @ 2 tablespoons/plant. During second application, an equal amount of P is applied and this is done when new growth reaches 4 to 6 inches. Last P-application is done when the first blossoms have faded

Potash Requirements: Most of the soils contain adequate amounts of potash; however very light sands may be low in potash and hence K-application is recommended in such soils. Recommended rate is 1 tablespoonful of muriate of potash, or its equivalent, per plant per year

Iron Requirements: Some soils are deficient in iron and in such cases iron chelates should be applied to the soil as foliar applications. Two or three applications, applied early in the growing season, may be required

Magnesium Requirements: Magnesium and Zinc deficient soils can be treated with foliar applications of a chelated micronutrient fertilizer



Deficiency Symptoms of Major Plant Nutrients in a Rose Garden

Nutrient	Role	Deficiency Symptoms
Nitrogen (N)	N is essential for vegetative growth	<ol style="list-style-type: none"> 1. Pale green-yellow leaves 2. Short, weak stems 3. Small flowers of faded color
Phosphorus (P)	P is essential, especially for developing flower buds	<ol style="list-style-type: none"> 1. The older leaves to drop without turning yellow 2. The stems may be weakened 3. Bud development may be slowed as a result of a small, weak root system
Iron (Fe)	Fe is essential for chlorophyll synthesis	<ol style="list-style-type: none"> 1. A light yellowing in the tips of the young leaves 2. In time, the area between the veins becomes yellow, while the larger veins still remain green
Magnesium (Mg)	Mg is essential for chlorophyll synthesis	<ol style="list-style-type: none"> 1. A loss of green color similar to iron deficiency 2. But even the smallest veins remain green 3. Deficiency symptoms are more pronounced at the top of the plant
Zinc (Zn)	Zn is essential for chlorophyll synthesis	<ol style="list-style-type: none"> 1. Chlorosis

Pruning

A good quality rose crop is obtained if roses are pruned at right time. As a rule, pruning of any plant is done when the plant is at its dormant stage. Pruning time and degree of pruning depends on the type of rose, climate, region, and vigor of plant growth. In tropical regions, rose bushes are allowed to grow larger than in the temperate regions. As a standard rule, high degree of pruning induces more number of flowers early, while lower pruning may result in lesser number of flowers but bigger flowers later. Table below shows the right time of pruning for different types of roses

Type of Roses	Time of Pruning
Hybrid tea roses	Late Winter
Floribunda roses	Late Winter
Climbing roses	Late Spring

Advantages of Pruning Roses

Pruning keeps plant healthy as all dead, diseased, damaged and weak stems and branches are removed during pruning process. Pruning improves overall appearance of the rose plants in terms of their size and shape, and help in better penetration of sunlight by keeping open centers during pruning process. Since roses are sun-loving plants, having open centers accelerate their healthy growth. Pruning improves the quality of the blooms and increases flower productivity per plant

Method Of Pruning

- Pruning is done by cutting at a 45-degree angle, normally 1/4-inch above the nearest outward-facing bud with the higher point above the bud by using secateurs
- During the pruning process, all dead, broken, damaged, or blotched stems are removed
- Then all weak, spindly canes or shoots and canes or shoots that are growing toward the center of the bush are removed
- As a rule, remove all the overcrowded shoots, shoots which are overlapping over healthy shoots, and shoots that hamper penetration of light and availability of air
- After pruning, the cut ends are covered with a fungicidal paste to prevent microbial infection

Some Pruning Tips

- Garden tools should always be clean and sharp
- Make sure pruning operations are suitable for each type of rose viz. Hybrid Teas, Floribunda, Climbers etc.
- Do not damage the plant while pruning
- Stems should be pruned at 45 degree angle to avoid water setting on the surface
- Do not forget to apply pruning paste to prevent attack of disease
- Remove all overlapped, dead, and diseased branches and twigs. Avoid harvesting fresh twigs, this may later produce good flowers
- For Hybrid T and Grandiflora, give a vase shape. Climbing roses are trained and trailed to desired direction and are pruned in early spring only. Heavy pruning is not required in shrub roses

Insect Pest Management

The crop is affected by many insects and diseases. Suitable control measures need to be taken in order to get a healthy rose plantation. Some of the major insects that affect the rose plants are aphids, thrips, red scales, white ants and red spider mites

Aphids or Plant Lice

- *Large Aphids*: green or pink in colour, attacks the growing tips and buds, flower petals of infested buds are puckered, small and off-color, or the entire bud may turn brown without opening
- *Small Aphids*: green in colour, and sucks the juices from the underside of the leaves and produces honeydew
- *Control Measure*: Frequent spraying of the rose plants with a strong stream of water will wash aphids off the plants. However in cases of serious infestations, application of a recommended insecticide is advised

Red Spider Mite or Two-Spotted Spider Mite

- These insects are very small and cannot be seen with naked eye. They damage rose foliage severely. Major symptom include a yellow mottled pattern of the leaves

Borers

- Upon borer infestation, rose plants start to die back
- *Control Measure:* Good cultural practices

Thrips

- Thrips feed on unfolding buds and the infested buds turn brown and die. Thrip infestation mainly seen in partially shaded plants
- *Control Measure:* Apply a recommended insecticide

White Ants

- This insect destroys the root of plant as a result the plant dies
- *Control Measure:* Apply a recommended insecticide

Chafer Beetle

- This insect cuts the leaves of plant
- *Control Measure:* Apply a recommended insecticide

Digger Wasp

- Digger wasps attack freshly pruned plants by making holes in the cuts
- *Control Measure:* Apply a recommended insecticide

Red Scale

- Red scale sucks the plant sap after forming red incrustations outside the branch as a result the plants die
- *Control Measure:* Apply a recommended insecticide

Cultural Practices to Avoid Pest Infestation in a Rose Garden

1. The plants and areas around them should be kept clean and free from unwanted weeds and fallen and dried leaves and flowers
2. All rotten flowers and leaves should be removed from plant parts as well as from field, these are the main causal agents of diseases
3. There should be proper air circulation and water in the plant and soil should be moist
4. Proper pruning is always helpful and application of pruning paste on the cut wounds is must
5. The planting distance between roses should be proper as recommended so that there is no competition, better weed management and less disease and insects infestation

Disease Management In Roses

Powdery Mildew

- Powdery Mildew is a fungal disease that attacks the young leaves, buds, and shoots of susceptible varieties. Climbing roses are most susceptible. It is prevalent in humid, warm and cool climate. There is a white powdery growth on the young leaves and the leaves drop after turning purple and disfigured the plant. There is no opening of flower buds in the infected plant
- *Control Measure:* Powdery mildew requires repeated spraying of Sulphur or Sulphur containing fungicides @ 0.1% concentration throughout the growing season

Die Back of Roses

- Dieback affects the plant if proper care is not given after pruning; symptoms include blackening and drying of pruned shoots
- *Control Measure:* After pruning, pruning paste is applied. It is a paste which contains 800 gm of Copper Carbonate, 800 gm of Red Lead and 1 L of Linseed oil. It is also known as Burgundy Mixture

Rose Canker

- Rose Canker attacks through pruning wounds and infected shoots become dead and discolored
- *Control Measure:* Application of copper based fungicides

Crown Gall

- Crown Gall is a bacterial disease characterized by the presence of rough galls or swellings on the roots and/or on the crown of the rose plants
- *Control Measure:* Discard diseased plants with the surrounding soil and replace with clean soil before replanting

Black Spot

- Black Spot is a fungal disease that infects both sides of leaves; symptoms include prominent black spots with fringed margins on either side of the leaves. In serious infestations, leaves turn yellow, dry and finally drop
- *Control Measure:* Spraying a recommended fungicide @ 0.2% fortnightly

Harvesting of Roses

Roses are harvested at different levels of maturity, depending on market requirements and type of varieties. Early morning before sunrise is proper time for harvesting the crop. A description of various harvesting stages for roses is given below in coming slides

Harvesting Requirements

- ***For Long-Distance Transport or Storage:*** Roses should usually be harvested with some of the sepals reflexed. Flowers harvested before the sepals reflex may fail to open, or may be more susceptible to bent neck
- ***Fast-Opening Roses:*** They should be harvested just before the sepals start to separate from the bud. The marketing life of roses harvested later will be reduced unless extra care is taken with their postharvest handling

Harvesting Requirements for Cut Flowers

For cut flower purpose, roses are harvested when buds start opening and sepals get fully curled. Harvesting is done at a 45 degree angle along with some portion of stem. Red and pink varieties of roses are harvested when 1 or 2 petals start appearing. Yellow colored roses are harvested before fully opening. Freshly harvested roses are immediately submerged into water or any floral preservative to retain moisture and increase vase-life of the rose flowers. The thorns and leaves are removed from lower part of stem to avoid disease infestations

Harvesting Requirements for Processing Purposes

For processing purposes roses can be harvested throughout the flowering season. Harvesting is done when all petals are bloomed but not yet started wilting. During harvesting a full flower head is cut so that more blooms will be produced on next harvesting. For rose hips, flowers are harvested at maturity, after they wither completely

Harvesting Method

If properly handled, freshly-harvested roses will easily last in the vase for 10 days. Harvesting is done using shears and the cut is made normally at a 45 degree angle in such a way that 2 five-foliolate leaves are left below the cut. Already open – flowers are avoided while harvesting

Sorting

Sorting is done based on the appearance and fresh-quality of flowers

Grading

Grading is done based on stem length, flower maturity, stem straightness, stem caliper, and quality of flower and foliage. Bunching is done based on market requirements

Bunching

The number of rose stems per bunch, and bunching pattern (single layer, staggered two-layer etc) depend on market preferences

Packing

Rose bunches are packed in polyethylene wraps, waxed paper, or soft corrugated boxes. Standard dimensions of a corrugated box are 100cm X 45cm X 22cm

Pre-Cooling

Pre-cooling is done immediately after grading and packing. Major purpose of pre-cooling is to remove field heat and in certain cases such as in case of ethylene-sensitive varieties to decrease the amount of ethylene. Precooling is best done by forcing cold air through packed boxes. Alternatively, the opened boxes may be kept under cold storage for up to 8 hours before transporting them

Storage and Transport

Optimum storage temperature for freshly harvested rose flowers is at 0-1°C. Roses should be stored dry without any moisture presence on them. For long-term storage of roses i.e. up to 2 weeks, roses should be packed in polyethylene-lined cartons and pre-cooled before storing them in dry storage at 0-1°C. Roses are transported using refrigerated vans or Reefer-vans where the temperature is adjusted so as to preserve the shelf-life of cut flowers

Controlling Bruises during Transport of Roses

The petals of roses are very delicate, and are susceptible to compression bruising during transport. University of California's standard recommendations for packing roses are to pack gently, but securely so that vibration bruising is avoided and avoid over-packing

Facts to Remember

- Since Botrytis infection is a major problem for roses, postharvest fungicidal dip of freshly harvested cut flowers is highly advised
- Use only registered products according to label instructions
- Petal blackening on some red cultivars of roses is due to a fungal infection and the reason behind this condition is poor growing conditions
- This problem cannot be corrected at wholesale or retail levels



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